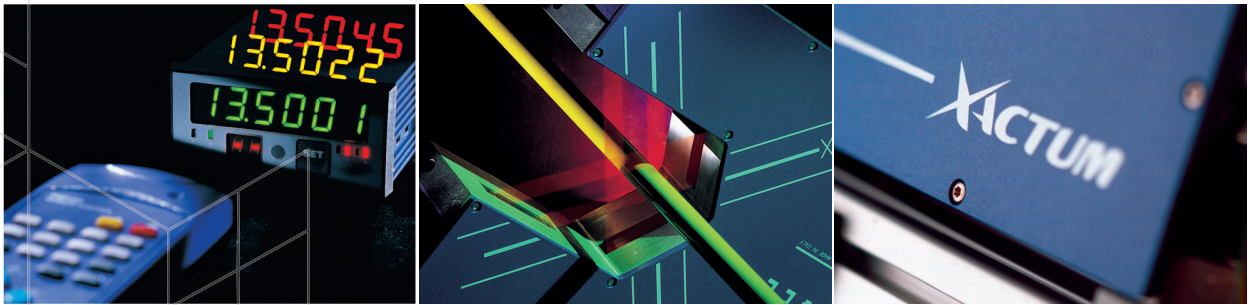# AEROEL
XLS13XY XLS35XY

Dual Axis Laser Micrometers
for very high accuracy diameter measurement

Ultra accurate, high speed Laser Gauges for contact-less diameter measurement, featuring built-in electronics and Ethernet/Rs232/Rs485 interface

- Dual axis gauge
- Multiple measuring modes
- Up to 0.02 μm repeatability
- 1500 Hz scanning frequency
- Outstanding single shot repeatability
- Permanent self calibration
- Fully re-programmable
- Direct connection to PC, PLC e NC
- Motor with Fluid Dynamic Bearing Technology
- NO-VAR: active thermal compensation
- Direct connection to Internet Browser
- Capability to store different application programs
- Inputs for reading and synchronizing quadrature encoders

NEW

It's an ideal Intelligent Diameter Sensor for the on-line control of products like:

- Extruded tubes and profiles
- Drawn metal wires
- Medical tubes
- Electric cables and conductors
- Optical fibres

# MARPOSS

The XY Sensor Software

The XLS sensors are equipped with a pre-loaded software to perform different types of measurements and in several modes, to meet a number of applications. In general the instrument performs just as an Intelligent Sensor, transmitting the measured data to an external device, through its serial ports. The tolerance checking or other more sophisticated features are not not included, these are performed by the user's device or by the available Aeroel Dedicated Systems.

Types of measures

Only 1 part in the measuring field, opaque or transparent.

Measured dimensions: X and Y diameters and X-Y centre position

Note: other types of measures are possible by loading dedicated software
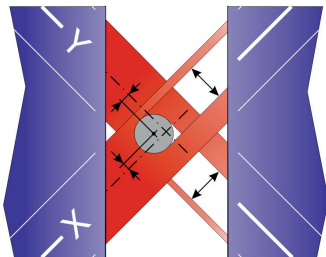
Measuring transparent objects

Enabling the Glass-Logic, it is possible to check also transparent parts, like glass tube or medical tube.

Single face scanning

It is possible to use 1 mirror face only, to cancel the side dither of the scanning plane: when this option is selected, the scanning rate is reduced to 120 Hz or 125 Hz

Measurement processing

Instant values: simple average over n scans, being n ≥ 1 programmable

Extreme values: Average, Max, Min over k Instant Values, being k ≥ 1 programmable

Measurement mode

Free-Running: it processes continuously groups of k instant values to compute the related Extreme Values.

On-Command, Single-Shot: after an external command, it processes only 1 group of k instant values to compute the related Extreme Values. The external command is a rising edge on a digital input or a command message via Ethernet/RS232.

On-Command, Continuous: during a time interval set by an external command, it processes all the measured Instant Values, to compute their Extreme values. The measuring time is set by a logic high level on a digital input and/or by Start/Stop messages via Ethernet/RS232.

Auto-Sync: like On-Command, Single-Shot, but the measurement is automatically triggered by a valid measurement condition (1 part in the measuring field).

XLS13XY/480 **XLS13XY/1500** **XLS35XY**
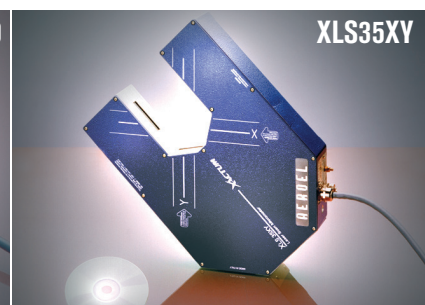
The Blistbuster software to detect recurrent surface flaws
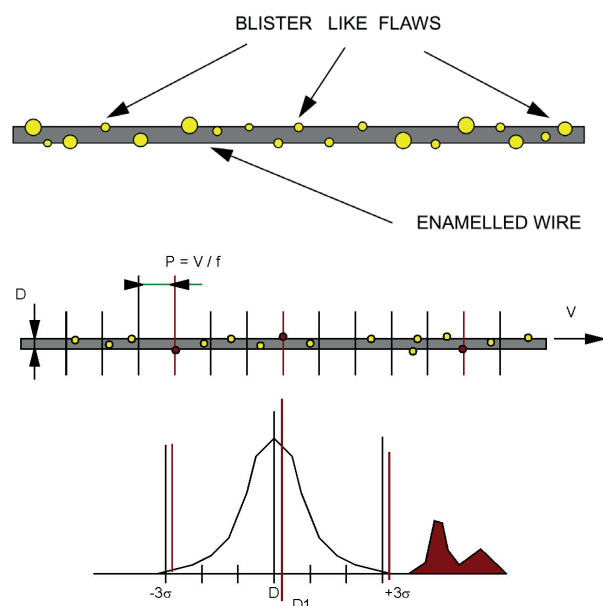
AEROEL EXCLUSIVE

The XY sensor software includes the **Blistbuster** feature that can be very useful to check the **diameter smoothness** of a continuous product (for instance magnet wire) and to detect a very special type of **recurrent flaws**, commonly called "**Blisters**".

Processing a rather high number of single-scan measurements along the product, it is possible to determine that some of these have been taken just over a local flaw, as the result of such a scan is very different form the average wire diameter and much higher than the single scan repeatability of the gauge itself. An exclusive processing algorithm computes some parameters which are very useful to depict the non-uniformity of the product surface.

As the processing algorithm is based on statistical assumptions, a quite long section of wire must be checked, including a rather high number of flaws. **It is impossible to detect any single flaw or to measure its real dimensions, unless the flaw length be longer than the scanning pitch.** (*)

(*) The scanning pitch is computed dividing the product speed by the gauge scanning frequency

BLISTER LIKE FLAWS

ENAMELLED WIRE

$P = V / f$

Exclusive Aeroel features


AEROEL EXCLUSIVE

- The scanning motor **without ball bearing** works perfectly, with no wear.
- **The NO-VAR option** allows you to automatically compensate for the expansion of the part when room temperature changes. The user only needs to program the proper coefficient of thermal expansion of the part.
- **The Web Server** allows you to connect the sensor through the Ethernet line to any Internet browser and "see it" as a website, where you can view the measures, enable an application program may be installed, set-up and program the gauge and even display the video signal (light pulse).
- In the memory of the sensor you can store **up to 3 different application programs**. The program change is possible only by connecting a PC to the Ethernet port and using a special Aeroel software utility or the Web Server function.
- The two sensor inputs **can be programmed** to read the signals of a quadrature encoder and i.e. synchronizing the gauge measurements with the position measured along the axis of the piece.
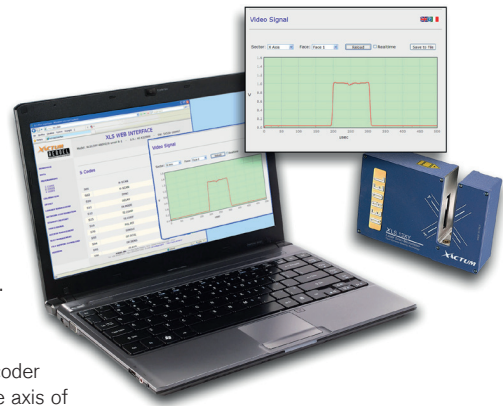
Programming and set-up

The sensor Set-up and programming are possible through the **RS232**, **RS485** or **Ethernet** ports, using the Aeroel protocol and dedicated commands. In addition, there are several possibilities for using the sensor without writing any specific communication software:

- The **Web Server** allows you to connect the sensor through the Ethernet line to any Internet browser and "see it" as a website
- The **VT100 terminal mode** (through the RS232 port) makes it possible the connection of the sensor to a PC using the Windows (*) Hyperterminal program
- You can use an optional hand-held VT-100 terminal.
- Using an optional **DM-200 display** module with IR Remote Control, you can display the measurement data and program the sensor
- **GageXcom** software running on PC, to program the sensor and to get the measured data through Excel (*) spreadsheets.
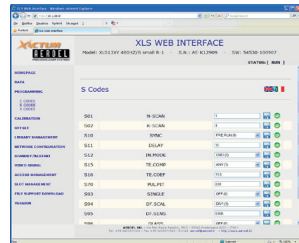
Input/Output and Interfacing

- 2 optocoupled digital inputs, 10 – 30 Vdc, (5 - 15 mA). The two inputs can be programmed for different functions:
  - Start/Stop measurement and Send Data via RS232
  - Pulse counter and Reset command for meter counting function
  - To read the signals from a quadrature encoder, to synchronize the measures with the part position
  - Pulse counter and Reset command for the synchronization of several sensors
- Rs232, max 115.2 Kbaud, Master or Slave, for sensor programming, data transmission and commands (Aeroel protocol)
- Rs485, max115.2 Kbaud, used in Master mode to drive Aeroel Units (i.e. Display Module) or in Slave mode to network the sensor (Aeroel protocol)
- Ethernet 10 Base-T, TCP/IP protocol for for sensor programming, data transmission, commands and networking
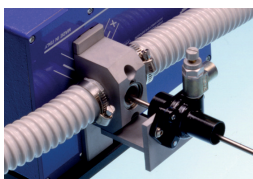
Accessories

DM-200, 6 digit Multicolor LED display module to display the measured data and to program the sensor through its IR Remote Control.
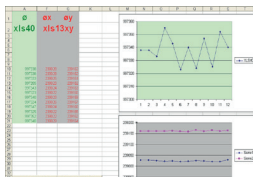
GageXcom software running on PC, to program the sensor and to get the measured data through Excel (*) spreadsheets.


Dust protective brackets with compressed air, to use the sensors in heavy-duty environment.

- IR Remote Control to program the sensor and to drive the display module.
- Devices and fixture to hold and transport the part being measured.
- Devices to clean the product being measured.
- RS232/Profibus or RS232/Profinet bidirectional converter modules
- XLS-NCB, connecting box with universal power supply and sockets for network connection through Ethernet or RS485 ports and RS232 connection.
- Connecting cables and extensions.
- PC software for driving an Ethernet network of sensors.
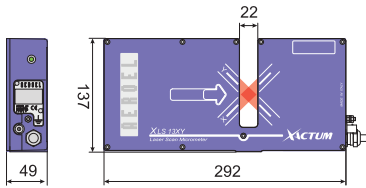- Calibration report.

(*) Windows and Excel are registered trademarks of Microsoft Corporation

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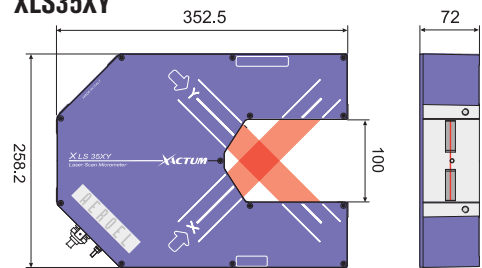AEROEL

Specifications

XLS13XY/480
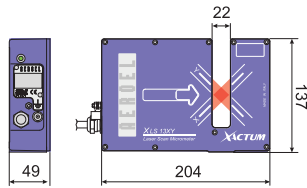
XLS13XY/1500

XLS35XY

All the dimensions are in mm.

Type of gauge		XLS13XY/480	XLS13XY/1500	XLS35XY/480	XLS35XY/1500
Measuring Field (mm)	mod. /A	13 x 13 [1]		35 x 35 [2]	
	mod. /B /F [3]	4 x 4 [4]			
Measurable Diameters (mm)	mod. /A	0.1 ÷ 10		0.2 - 32	
	mod. /B	0.03 - 3 [5]	0.05 - 3 [5]		
	mod. /F [3]	n.a. [3]	0.02 - 3		
Resolution (Selectable) (µm)		10 / 1 / 0.1 / 0.01			
Linearity (Centred Product) [6] (µm)		± 0.5 [7]		± 1 [8]	
Linearity (Full Range) [9] (µm)	mod. /A	± 1.5		± 2.5	
	mod. /B /F [3]	± 1		± 2.5	± 5
Linearity (Reduced Field) [10] (µm)	mod. /A	± 1		± 1.5	
	mod. /B /F [3]	± 0.5			
Repeatability (T=1s, ±2σ) [11] (µm)	mod. /A	± 0.15 [12]	± 0.04 [13]	± 0.3	± 0.15
	mod. /B /F [3]	± 0.03 [14]	± 0.02 [15]		
Beam Spot Size (s,l) [16] (mm)	mod. /A	0.1 x 4		0.2 x 4	
	mod. /B	0.03 x 0.1	0.05 x 0.1	0.2 x 0.1	
	mod. /F [3]	n.a. [3]	0.02 x 0.1	n.a. [3]	
Scanning Frequency (Hz)		480 (X) + 480 (Y)	1500 (X) + 1500 (Y)	480 (X) + 480 (Y)	1500 (X) + 1500 (Y)
Scanning Speed (m/s)		156	163	288	300
Thermal Coefficient [17] (µm/m°C)		-11.5			
Power Supply		24 VDC; 0.3 A (1 A spunto)			
Laser Source		VLD (Visible Laser Diode); λ = 650 nm			
Dimensions [18] (mm)		204 x 137 x 49	292 x 137 x 49	352.5 x 258.2 x 72	
Weight [18] (kg)		2	2.5	5.8	
Operating Temperature Range (°C)		0 - 50			
Storage Temperature (°C)		-20 - +70			
Atmosferic Humidity		Max 85% (non-condensing)			
Altitude (m)		0 - 3000 over sea level			
Protection		IP65			

Notes

[1] For Ø ≥ 0.3 mm; for smaller diameters the field is proportionally reduced up to 4x4 mm for Ø = 0.1 mm.

[2] For Ø ≥ 0.3 mm; for smaller diameters the field is proportionally reduced up to 20x20 mm for Ø = 0.2 mm.

[3] The model /F is only available in version XLS13XY/1500/F.

[4] For Ø ≥ 0.1 mm; for smaller diameters the field is proportionally reduced up to 1x1 mm for Ø = 0.03 mm (XLS13XY/480), Ø = 0.05 mm (XLS13XY/1500/A and /B) or Ø = 0.02 mm (XLS13XY/1500/F)

[5] With centred product the maximum measurable diameter is 10 mm.

[6] Related to the average diameter (X+Y)/2. The linearity value is inclusive of the Aeroel's masters uncertainty (± 0.3 µm)

[7] For Ø ≤ 1 mm. For Ø > 1 mm the linearity is ± 1 µm.

[8] For Ø ≤ 15 mm; for Ø >15 mm the linearity is ± 1.5 µm (± 2.5 µm for the model 1500/B)

[9] Maximum measurable shift of the average diameter (X+Y)/2, when a master is moved along the two X and Y axes crossing the centre of the field, checked with Ø = 3 mm (XLS13XY/*/A), with Ø = 1 mm (XLS13XY/*/B or /F) or with Ø = 8 mm (XLS35XY). The linearity value is inclusive of the Aeroel's masters uncertainty (± 0.3 µm).

[10] The reduced field is 5x5 mm for XLS13XY/*/A gauges, 2x2 mm for XLS13XY/*/B or /F gauges and 16x16 mm for XLS35XY gauges. The linearity value is inclusive of the Aeroel's masters uncertainty (± 0.3 µm).

[11] Repeatability is the same for both axes and it is related to the mean diameter (X+Y)/2. Single shot repeatability (± 2σ) is ± 1 µm (XLS13XY/480), ± 0.75 µm (XLS13XY/1500 for Ø ≤ 3 mm), ± 1.5 µm (XLS13XY/1500 for Ø > 3 mm), ± 3.5 µm (XLS35XY/480) and ± 2.5 µm (XLS35XY/1500).

[12] For Ø ≤ 0.5 mm the repeatability is ± 0.03 µm.

[13] For Ø ≤ 0.5 mm the repeatability is ± 0.02 µm.

[14] For Ø ≤ 0.5 mm. For Ø > 0.5 mm the repeatability is ± 0.08 µm.

[15] For Ø ≤ 0.5 mm. For Ø > 0.5 mm the repeatability is ± 0.03 µm.

[16] Elliptical spot: "s" is the thickness and "l" is the width.

[17] This is the measuring error due to a change in the ambient temperature when measuring a part with zero thermal expansion coefficient (INVAR). This is specified for gauges using a software PRESET for the NO-VAR option and when the rate of change of the ambient temperature is lower than 3°/h. When the NO-VAR option is ENABLED, the gauge thermal expansion coefficient is programmable by the user.

[18] The connecting cable is not included.

Specifications subject to change without notice

CE

CAUTION LASER RADIATION DO NOT STARE INTO BEAM VISIBLE LASER DIODE 400 - 700 nm 1 mW MAXIMUM OUTPUT CLASS II LASER PRODUCT

LASER RADIATION DO NOT STARE INTO BEAM CLASS 2 LASER PRODUCT 400-700 nm < 1 mW CEI EN 60825-1:2014

This product conforms to the following standards: 21 CFR 1040.10 (USA) • CEI EN-60825-1:2014 (EU)

MARPOSS AEROEL

csq ISO 9001:2015

CERTIFIED MANAGEMENT SYSTEM IQNet